

U.S. Application No. 09/457,732  
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(YOR.080)

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**AMENDMENTS TO THE CLAIMS:**

1. (Currently amended) A method of processing semiotic data, comprising:
  - receiving semiotic data including at least one data set P;
  - selecting a function h, and for at least one of each said data set P to be collected,
  - computing h(P);
  - destroying said data set P;
  - storing h(P) in a database, and
  - obtaining a sample of P' such that a comparison can be made;
  - at least one of obtaining and computing h(P'); and
  - to determine whether P' is close to a predetermined subject, comparing h(P') to available h(P)s to determine whether P' substantially matches, but does not exactly match, one of said data set P,
  - wherein said data set P cannot be extracted from h(P),
  - wherein said semiotic data comprises biometric data,
  - wherein said function h comprises a secure hash function,
  - wherein the data set P is not determined perfectly by its reading,
  - wherein each reading gives a number P<sub>i</sub>, wherein i is no less than 0, wherein P<sub>0</sub> is for an initial reading, and a secret version of said initial reading is stored after further processing thereof,
  - wherein reading P<sub>0</sub> is different from P<sub>i</sub> for i > 0, and the secret version of P<sub>0</sub> is different from the secret version of P<sub>i</sub>, such that no identification is possible by a direct comparison of the encrypted data,
  - said method further comprising:

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extracting sub-collections  $S_j$  from the collection of data in data set  $P$ ;  
encrypting a predetermined number of such sub-collections such that at least one  
of the sub-collections is reproduced exactly with a predetermined probability,  
comparing encrypted versions of the sub-collections  $S_j$  with those data stored in  
said database,  
wherein if one or more of the sub-collection  $S_j$  matches with said data, then  
verification is deemed to have occurred,  
each time a  $P_i$ , with  $i > 0$ , is read, computing all possible predetermined size variations of  
 $P_i$  which correspond to an acceptable predetermined imprecision of the reading; and  
encrypting all such modified data, and comparing said encrypted modified data to data  
stored in said database,  
wherein for a plurality of users of the same biometric information, said biometric  
information is encrypted differently for each user, and  
wherein at least one of said data set  $P$  and  $P'$  comprises a personal data set.

2-4. (Canceled).

5. (Previously presented) A method of processing semiotic data, comprising:  
receiving semiotic data including at least one data set  $P$ ;  
selecting a function  $h$ , and for at least one of each said data set  $P$  to be collected,  
computing  $h(P)$ ;  
destroying said data set  $P$ ; and  
storing  $h(P)$  in a database,

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- wherein said data set P cannot be extracted from  $h(P)$ ,  
the method further comprising:  
selecting a private key/public key (K, k) once for all cases; and  
one of destroying said private key K and sending said private key K to a trusted party;  
and  
choosing said function h as the public encryption function corresponding to k.
6. (Original) The method according to claim 5, wherein said data set P cannot be extracted from  $h(P)$ , except by the trusted party.
7. (Previously presented) The method according to claim 5, further comprising:  
to determine whether some  $P'$  is a predetermined subject, comparing said  $h(P')$  to available  $h(P)$ s; and  
determining whether there is a match.
8. (Original) The method according to claim 5, wherein the trusted party comprises a panel of members, and  
wherein a secret is shared among the members so that only at least a predetermined number of panel members can reconstitute the secret in its entirety by putting together their share of the secret.
9. (Previously presented) A method of processing semiotic data, comprising:  
receiving semiotic data including at least one data set P;

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selecting a function  $h$ , and for at least one of each said data set  $P$  to be collected,  
computing  $h(P)$ ;

destroying said data set  $P$ ; and

storing  $h(P)$  in a database,

wherein said data set  $P$  cannot be extracted from  $h(P)$ ,

wherein the data set  $P$  is not determined perfectly by its reading,

wherein each reading gives a number  $P_i$ , wherein  $i$  is no less than 0, wherein  $P_0$  is for an initial reading, and a secret version of said initial reading is stored after further processing thereof,

wherein reading  $P_0$  is different from  $P_i$  for  $i > 0$ , and the secret version of  $P_0$  is different from the secret version of  $P_i$ , such that no identification is possible by a direct comparison of the encrypted data.

10. (Original) The method according to claim 9, further comprising:

extracting sub-collections  $S_j$  from the collection of data in data set  $P$ ; and

encrypting a predetermined number of such sub-collections such that at least one of the sub-collections is reproduced exactly with a predetermined probability.

11. (Original) The method according to claim 10, further comprising:

comparing encrypted versions of the sub-collections  $S_j$  with those data stored in said database,

wherein if one or more of the sub-collection  $S_j$  matches with said data, then verification is deemed to have occurred.

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12. (Original) The method according to claim 11, further comprising:

each time a  $P_i$ , with  $i > 0$ , is read, computing all possible predetermined size variations of  $P_i$  which correspond to an acceptable predetermined imprecision of the reading; and

encrypting all such modified data, and comparing said encrypted modified data to data stored in said database.

13. (Original) The method according to claim 12, wherein for a plurality of users of the same biometric information, said biometric information is encrypted differently for each user.

14. (Previously presented) The method according to claim 1, wherein at least one of said data set P and P' comprises a personal data set.

15. (Previously presented) A method of processing biometric data, comprising:

acquiring unencrypted biometric data including at least one data set P;

encrypting, with one of a secure hash function and an identity function, each said at least one data set acquired;

destroying the unencrypted data set P;

storing each of the at least one encrypted data set in a database,

wherein unencrypted biometric data is not available nor retrievable from said data stored in said database, and

to determine whether a data set P' is a predetermined subject, comparing an encrypted data set of P' to the at least one encrypted data set stored in the database to determine whether the

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data set P' substantially matches, but does not exactly match, the at least one encrypted data set stored in the database.

16. (Previously presented) The method according to claim 15, wherein at least one of said data set P and P' comprises a personal data set.

17. (Previously presented) A method of extracting components of biometric data which are stable under measurement errors, comprising:

acquiring unencrypted biometric data including at least one data set P;

encrypting each said at least one data set acquired to form at least one encrypted data set;

destroying the unencrypted data set P;

storing each said at least one encrypted data set in a database,

wherein unencrypted biometric data is not available nor retrievable from said data stored in said database, and

to determine whether a data set P' is a predetermined subject, comparing an encrypted data set of P' to the at least one encrypted data set stored in the database to determine whether there is a match.

18. (Previously presented) The method according to claim 17, wherein at least one of said data set P and P' comprises a personal data set.

19. (Original) A method of extracting components of biometric data which are stable under measurement errors, comprising:

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acquiring unencrypted biometric data including at least one data set P;  
encrypting each said at least one data set acquired to form at least one encrypted data set;  
destroying the unencrypted data set P; and  
storing each said at least one encrypted data set in a database,  
wherein unencrypted biometric data is not available nor retrievable from said data stored  
in said database,  
extracting sub-collections  $S_j$  from the collection of data in said data set P; and  
encrypting a predetermined number of such sub-collections such that at least one of the  
sub-collections is reproduced exactly with a predetermined probability.

20. (Original) The method according to claim 19, wherein said data set comprises a personal data set.

21. (Original) The method according to claim 19, further comprising:

comparing encrypted versions of the sub-collections  $S_j$  with those data stored in said database,

wherein if one or more of the sub-collection  $S_j$  matches with said data, then verification is deemed to have occurred.

22. (Original) The method according to claim 21, wherein a data set P is not determined perfectly by its reading, such that each reading gives a number  $P_i$ ,  
wherein  $i$  is no less than 0,

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wherein P0 is for an initial reading, and a secret version of said initial reading is stored after further processing thereof,

wherein reading P0 is different from  $P_i$  for  $i > 0$ , and the secret version of P0 is different from the secret version of  $P_i$ , such that no identification is possible by a direct comparison of the encrypted data.

23. (Original) The method according to claim 21, further comprising:

each time a data set is read  $P_i$ , with  $i > 0$ , is read, computing all possible predetermined size variations of  $P_i$  which correspond to an acceptable predetermined imprecision of the reading; and

encrypting all such modified data, and comparing said encrypted modified data to data stored in said database.

24. (Previously presented) A system for processing semiotic data, comprising:

means for receiving semiotic data including a data set P;  
means for selecting a function h, and for each said data set P to be collected, computing  $h(P)$ ;  
means for destroying said data set P;  
means for storing  $h(P)$  in a database, wherein said data set P cannot be extracted from  $h(P)$ , and

to determine whether a data set P' is close to a predetermined subject, means for comparing  $h(P')$  to available  $h(P)$ s to determine whether data set P' is close to some P.



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25. (Previously presented) A system of processing semiotic data as in claim 24, wherein said semiotic data comprises biometric data.

26. (Previously presented) The system according to claim 24, wherein at least one of said data set P and P' comprises a personal data set.

27. (Previously presented) A system for verifying biometric data without storing unencrypted biometric data, comprising:

means for acquiring unencrypted biometric data including at least one data set P;

means for encrypting each said at least one data set acquired to form at least one encrypted data set; means for destroying the unencrypted data set P;

means for storing each said at least one encrypted data set in a database, wherein unencrypted biometric data is not available nor retrievable from said data stored in said database, and

means for comparing an encrypted data set of a data set P' to said at least one encrypted data set of data set P to determine whether there is a match and to determine whether the data set P' is a predetermined subject.

28. (Previously presented) The system according to claim 27, wherein at least one of said data set P and P' comprises a personal data set.

29. (Original) A system for extracting components of biometric data which are stable under measurement errors, comprising:

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acquiring unencrypted biometric data including at least one data set P; encrypting each said at least one data set acquired to form at least one encrypted data set;  
destroying the unencrypted data set P; and  
storing each said at least one encrypted data set in a database,  
wherein unencrypted biometric data is not available nor retrievable from said data stored in said database,  
extracting sub-collections S<sub>j</sub> from the collection of data in said data set P; and  
encrypting a predetermined number of such sub-collections such that at least one of the sub-collections is reproduced exactly with a predetermined probability.

30. (Previously presented) The system according to claim 29, wherein said data set comprises a personal data set.

31. (Previously presented) A signal-bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform a method for computer-implemented processing biometric data, said method comprising:

receiving biometric data including a data set P;  
selecting a secure hash function h, and for each data set P to be collected, computing h(P);  
destroying said data set P;  
storing h(P) in a database, wherein said data set P cannot be extracted from h(P), and  
to determine whether a data set P' is close to a predetermined subject, comparing h(P') to available h(P)s to determine whether data set P' is close to some data set P.

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32. (Previously presented) The signal-bearing medium according to claim 31, wherein at least one of said data set P and P' comprises a personal data set.

33. (Previously presented) A signal-bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform a method for computer-implemented verifying of biometric data without storing unencrypted biometric data, said method comprising:

- acquiring unencrypted biometric data including at least one data set P;
- encrypting each said at least one data set acquired to form at least one encrypted data set;
- destroying the unencrypted data set P;
- storing each said at least one encrypted data set in a database, wherein unencrypted biometric data is not available nor retrievable from said data stored in said database, and
- to determine whether a data set P' is close to a predetermined subject, comparing an encrypted data set of P' to said at least one encrypted data set to determine whether data set P' is close to some data set P.

34. (Previously presented) The signal-bearing medium according to claim 33, wherein at least one of said data set P and P' comprises a personal data set.

35. (Original) A signal-bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform a method for computer-

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implemented extracting components of biometric data which are stable under measurement errors, said method comprising:

acquiring unencrypted biometric data including at least one data set P; encrypting each said at least one data set acquired to form at least one encrypted data set;

destroying the unencrypted data set P;

storing each said at least one encrypted data set in a database, wherein unencrypted biometric data is not available nor retrievable from said data stored in said database;

extracting sub-collections S<sub>j</sub> from the collection of data in said data set P; and

encrypting a predetermined number of such sub-collections such that at least one of the sub-collections is reproduced exactly with a predetermined probability.

36. (Previously presented) The signal-bearing medium according to claim 35, wherein said data set comprises a personal data set.

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